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# Basal Sprout Production in a Vector-Borne Tree Disease System: Do Sprouts Help or Hurt?

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Many tree species respond to disturbances by producing shoots, called basal sprouts, from the base and root system of a dying tree, and these sprouts can help maintain the population after the disturbance. In the case of many fatal tree diseases, the production of basal sprouts can be a key contributor to population resurgence post-epidemic. However in the case of fatal vector-borne tree diseases, the production of basal sprouts by infected host trees may worsen the epidemic and lead to local host extinction rather than maintenance of the population. We consider as a case study Laurel Wilt, which is a fatal fungal tree disease vectored by an invasive beetle. After a susceptible tree becomes infected and dies from Laurel Wilt, the dead tree provides suitable host material for vector reproduction. Using a stage structured SI ODE model, we explore the effect of basal sprout production on the populations of both host and vector. We interpret our results to provide insight on the circumstances under which the production of basal sprouts within a fatal vector-borne tree disease system leads to an endemic disease state, a disease-free host population, or the local extinction of both host and vector.